IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Hideyasu MATSUMURA et al.	**Confirmation No.: 6325** Group Art Unit: 1796
Serial No.	: 10/541,391	Examiner: Winkler, Melissa A
Filed	: July 1, 2005	
For	:EXPANDABLE BEADS OF STYRENE-MODIFIED LINEARLOW-DENSITY POLYETHYLENE-BASED RESIN, PRODUCTION METHOD THEREFOR, PRE-EXPANDED BEADS AND EXPANDED MOLDED ARTICLE	

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Commissioner for Patents
U.S. Patent and Trademark Office
Customer Service Window, Mail Stop Appeal Brief - Patents
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

This Appeal is from the Examiner's rejection of claims 1-9 set forth in the Final Office Action mailed from the U.S. Patent and Trademark Office on January 25, 2008.

The fee for filing an Appeal Brief as set forth in 37 C.F.R. § 41.20(b)(2) is being paid concurrently herewith.

A Notice of Appeal in response to the January 25, 2008 Office Action was filed on July 25, 2008.

Inasmuch as this Appeal Brief is being filed within the initial two-month period prescribed by 37 C.F.R. § 41.37(a)(1), set to expire September 25, 2008, it is believed that no extension of time is required. However, the Patent and Trademark Office is hereby authorized to

charge any fee necessary for maintaining the pendency of this application, including any appeal or extension of time fees that may be necessary, to Deposit Account No. 19-0089.

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I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Sekisui Plastics Co., Ltd. of Osaka, Japan. The corresponding assignment was recorded in the U.S. Patent and Trademark Office on July 1, 2005 at REEL 017193, FRAME 0644.

II. RELATED APPEALS AND INTERFERENCES

On July 18, 2008 Appellants filed a Notice of Appeal with respect to the rejection of the claims of co-pending application Serial No. 10/540,866. The claims of the present application have provisionally been rejected on the ground of obviousness-type double patenting over claims 1, 4-6, 9-11 and 14 of the co-pending application (see below). Appellants, Appellants' representative or the Assignee are not aware of any other prior and pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

The status of the claims is as follows:

Claims 1-9 are pending in this application.

Each of claims 1-9 is indicated as rejected in the Final Office Action mailed January 25, 2008.

The rejection of each of claims 1-9 is under appeal. Claims 1-9 involved in the appeal are reproduced in the Claims Appendix attached hereto.

IV. STATUS OF AMENDMENTS

No Amendment has been filed subsequent to the Final Office Action mailed January 25, 2008.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A. Claim 1

Independent claim 1 is drawn to a method for producing expandable beads of a styrene-modified linear low-density polyethylene-based resin. The method comprises the following steps in the order recited:

dispersing 100 parts by weight of non-crosslinked linear low-density polyethylene-based resin beads, 30 to 300 parts by weight of a styrene-based monomer, and 0.1 to 0.9 parts by weight of a polymerization initiator relative to 100 parts by weight of the styrene-based monomer into a suspension containing a dispersant;

impregnating the styrene-based monomer into the low-density polyethylene-based resin beads by heating a resultant dispersion at such a temperature that polymerization of the styrene-based monomer does not substantially take place;

performing a first polymerization of the styrene-based monomer at a temperature of higher than (T-8) °C and lower than (T+1) °C (where T °C is the melting point of the low-density polyethylene-based resin beads);

adding a styrene-based monomer and 0.1 to 0.9 parts by weight of a polymerization initiator relative to 100 parts by weight of the styrene-based monomer when a conversion ratio of polymerization reaches to 80 to 99.9%, and performing impregnation of the styrene-based

monomer into the low-density polyethylene-based resin beads and a second polymerization of the styrene-based monomer at a temperature of higher than (T-15) °C and lower than (T+5) °C (where T °C is a melting point of the polyethylene-based resin beads) (wherein a total amount of the styrene monomers used in the first and second polymerizations is more than 300 parts by weight and not more than 1000 parts by weight relative to 100 parts by weight of the low-density polyethylene-based resin beads); and

impregnating a volatile blowing agent during or after the polymerization,

whereby resin components of the expandable beads contain a gel component comprising 2 to 40 wt% of a graft polymer.

See, e.g., page 6 line 1 to page 7, line 12 of the present specification.

B. Claim 4

Independent claim 4 is drawn to expandable beads of a styrene-modified linear low-density polyethylene-based resin comprising a volatile blowing agent and a base resin. The base resin contains more than 300 parts by weight and less than 1000 parts by weight of a polystyrene-based resin component relative to 100 parts by weight of a non-crosslinked linear low-density polyethylene-based resin component, and contains 2 to 40 wt% of a gel component comprising a graft copolymer of the polystyrene-based resin component and the low-density polyethylene-based resin component.

See, e.g., page 7 lines 13-23 of the present specification.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The broad issues under consideration are:

1. Whether claims 1, 2 and 5 are properly rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over JP 1-284536 to Takasama et al. (hereafter "TAKASAMA") in view of Wicher et al., U.S. Patent No. 6,608,150 (hereafter "WICHER") and in particular, whether the disclosures of TAKASAMA and WICHER are sufficient to establish a *prima facie* case of obviousness of the subject matter of claims 1, 2 and 5.

2. Whether claim 3 is properly rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over TAKASAMA in view of WICHER and further in view of Senda et al., U.S. Patent No. 4,368,218 (hereafter "SENDA") and in particular, whether the disclosures of TAKASAMA, WICHER and SENDA are sufficient to establish a *prima facie* case of obviousness of the subject matter of claim 3.

3. Whether claims 8 and 9 are properly rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over TAKASAMA in view of WICHER and further in view of Smith et al., U.S. Patent No. 3,963,816 (hereafter "SMITH") and in particular, whether the disclosures of TAKASAMA, WICHER and SMITH are sufficient to establish a *prima facie* case of obviousness of the subject matter of claims 8 and 9.

4. Whether claim 4 is properly rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over TAKASAMA and in particular, whether the disclosure of TAKASAMA is sufficient to establish a *prima facie* case of obviousness of the subject matter of claim 4.

5. Whether claims 6 and 7 are properly rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over TAKASAMA in view of SMITH and in particular, whether

the disclosures of TAKASAMA and SMITH are sufficient to establish a *prima facie* case of obviousness of the subject matter of claims 6 and 7.

6. Whether claims 1-9 are properly provisionally rejected on the ground of nonstatutory obviousness-type double patenting as allegedly being unpatentable over claims 1, 4-6, 9-11 and 14 of co-pending application No. 10/540,866.

VII. ARGUMENTS

A. Citation of Authority

Obviousness

The appropriate starting point for a determination of obviousness is stated in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 466 (1966):

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.

The test of obviousness *vel non* is statutory and requires a comparison of the claimed subject matter as a whole with the prior art to which the subject matter pertains. *In re Brouwer*, 77 F.3d, 422, 37 U.S.P.Q. 2d 1663 (Fed. Cir. 1996); *In re Ochiai*, 71 F.3d 1565, 37 U.S.P.Q. 2d 1127 (Fed. Cir. 1995).

Often, it will be necessary to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.

This analysis should be made explicit. There must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1740-1741. "A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *Id*, at 1741.

"If the Examiner fails to establish a *prima facie* case, the rejection is improper and will be overturned." *In re Rijckaert*, 9 F.3d, 1532, 28 U.S.P.Q.2d, 1956 (Fed. Cir. 1993), citing *In re Fine*, 837 F.2d 1071, 1074,5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988).

B. Claims 1, 2 and 5 Are Not Properly Rejected Under 35 U.S.C. § 103(a) As Being Unpatentable Over TAKASAMA In View of WICHER

1. Summary of Rejection

The rejection essentially alleges that TAKASAMA teaches a method of the type recited in present claim 1 except that a second polymerization step is not used in the method of TAKASAMA. In this regard, the rejection relies on WICHER and alleges that this document "teaches a step-wise process for polymerizing styrene monomer using two different temperature ranges" and further asserts that "it would have been obvious to a person of ordinary skill in the art to include an additional polymerization step in the process described by [TAKASAMA]. The motivation would have been that an additional polymerization step would be to provide for a

more complete polymerization of styrene, thereby reducing monomer content to acceptable levels for commercial processing". Passage bridging pages 4 and 5 of the Final Office Action of January 25, 2008.

The rejection further alleges that as TAKASAMA only discloses one polymerization the total amount of vinyl aromatic (e.g.) styrene monomer used is 5 to 300 parts by weight relative to 100 parts by weight of the low-density polyethylene resin beads but that a second polymerization allegedly taught by WICHER "would require the addition of more styrene (see Examples) and one may consequently arrive at the weight range of styrene taught by the applicants". Page 4, first paragraph of the Final Office Action.

The rejection concedes that TAKASAMA does not disclose the specific weight percentage of the gel component comprising the graft polymer of polystyrene on the polyethylene chain. In this regard, the Final Office Action alleges that TAKASAMA "teaches all of the claimed ingredient(s), and process limitation(s)", wherefore "the claimed effects and physical properties, i.e. a gel component comprising 2-40 wt% of a graft polymer, would implicitly be achieved by a composition with all the claimed ingredients". Page 5, last paragraph of Final Office Action.

The rejection fails to state any reason as to why in view of the teaching of TAKASAMA it allegedly would have been obvious to one of ordinary skill in the art to employ, e.g., an amount of polymerization initiator which is outside the range taught by TAKASAMA and within the range recited in present claim 1.

2. There is no motivation for one of ordinary skill in the art to combine the teachings of TAKASAMA and WICHER

Contrary to what is asserted in the present Office Action, there is no apparent reason for one of ordinary skill in the art to combine the teachings of TAKASAMA and WICHER. Specifically, TAKASAMA is concerned with the modification of pre-formed beads of an LLDPE-based resin by incorporating polystyrene into these beads, whereas WICHER is concerned with the production of polystyrene beads from scratch. In other words, the only thing that TAKASAMA and WICHER have in common is that the final products of the methods disclosed therein are beads and that these beads comprise polystyrene. However, in one case the beads are already pre-formed at the beginning of the method (TAKASAMA), whereas in the other case (WICHER) the beads are made from scratch. Also, the beads are of a very different nature, i.e., in one case (TAKASAMA) they are (polystyrene-modified) LLDPE-based resin beads and in the other case they are (plain) polystyrene beads.

Yet another reason why there is no motivation for one of ordinary skill in the art to combine the teachings of TAKASAMA and WICHER is that TAKASAMA requires the use of at least 1.0 parts by weight of polymerization initiator per hundred parts by weight of vinyl-aromatic monomer, whereas in all of the Examples of WICHER the total amount of the mixture of polymerization initiators employed is significantly lower, i.e., less than 0.5 parts by weight of styrene.

3. A combination of the teachings of TAKASAMA and WICHER does not result in the method of claim 1

a. Relative amount of styrene-based monomer

Even if one were to assume, *arguendo*, that there is a motivation for one of ordinary skill in the art to combine the teachings of TAKASAMA and WICHER, the method of TAKASAMA as modified by the teaching of WICHER would not result in the method of present claim 1.

Specifically, present claim 1 recites, *inter alia*, that the amount of styrene monomers used in the first and second polymerizations set forth therein is more than 300 parts by weight (and not more than 1000 parts by weight) relative to 100 parts by weight of the low-density polyethylene based resin beads. In comparison, TAKASAMA limits the amount of vinyl-aromatic monomer to 5 to 300 parts by weight per 100 parts by weight of resin particles. Accordingly it is not seen that TAKASAMA provides a teaching or suggestion to use more than 300 parts (and up to 1000 parts) by weight per 100 parts by weight of resin particles.

Since WICHER does not even disclose a polymerization of vinyl-aromatic monomer (e.g., styrene) in the presence of (LLDPE-based) resin particles, WICHER is apparently unable to cure the deficiency of TAKASAMA in this respect.

Appellants note that the rejection alleges that a second polymerization allegedly taught by WICHER "would require the addition of more styrene (see Examples) and one may consequently arrive at the weight range of styrene taught by the applicants" (emphasis added). Appellants respectfully submit that this is clearly a hindsight analysis. There is no reasonable basis for the assumption that if the method of TAKASAMA were to be carried out according to WICHER with a mixture of polymerization initiators at different polymerization temperatures it

would be advantageous, let alone necessary for any reason to increase the amount of vinyl-aromatic monomer relative to the resin particles beyond the 300 parts by weight per 100 parts by weight limit set forth by TAKASAMA.

b. Step-wise addition and polymerization of styrene-based monomer

Appellants further note that present claim 1 also recites, *inter alia*, the addition (and impregnation) of the styrene-based monomer to the LLDPE-based resin beads in a first step and in a second step, each of these two steps followed by a polymerization of the styrene-based monomer. As conceded by the Examiner, TAKASAMA fails to disclose more than one polymerization step in the method disclosed therein. Further, even if the method of TAKASAWA were modified according to the teaching of WICHER, the corresponding method would comprise the addition (and impregnation) of the styrene monomer in a single step, followed by a polymerization (arguably in two steps).

In particular, it is noted that as can be seen from the Examples of WICHER, all of the styrene monomer to be polymerized, with the exception of about 5 % used for dissolving the polymerization initiators before adding them to the reaction vessel, is present already at the beginning of the process. Even if one took the position that the styrene is added in two separate portions (about 95 % and about 5 %), the fact remains that the polymerization is initiated only after all of the styrene monomer has been added to the reaction vessel. In other words, even in this case the second (5 %) addition of styrene monomer is not followed by a second polymerization step.

Appellants note that the fact that in a method of TAKASAMA as modified by WICHER the entire styrene-based monomer would already be present at the beginning of the polymerization causes one of the problems the method of claim 1 seeks to overcome, i.e., that if a relatively large amount of styrene-based monomer and more than the maximum amount set forth in TAKASAMA (i.e., more than 300 and up to 1000 parts by weight of styrene-based monomer per 100 parts by weight of resin beads) is employed, the amount of styrene-based monomer that is polymerized before it is impregnated into the resin beads (and thus, is present as a polymer powder, e.g., on the outer surfaces of the resin particles) reaches a level which has a significant adverse effect on the physical strength and other properties of expanded molded articles made from the modified beads. In this regard, page 10, lines 8-15 and Comparative Example 8 of the present specification may, for example, be referred to.

c. Temperature and conversion rate in first polymerization

It further is noted that present claim 1 recites, *inter alia*, that the first polymerization of the styrene-based monomer is performed at a temperature of higher than (T-8) °C and lower than (T+1) °C (where T °C is the melting point of the low-density polyethylene-based resin beads) and that the second addition, impregnation and polymerization of the styrene-based monomer is carried out only after the conversion ratio of the first portion of the styrene-based monomer has reached 80 to 99.9%. In this respect the rejection relies on Example 4 of WICHER and alleges, *inter alia*, that in the case of Example 4 the conversion of the styrene monomer after the first polymerization step (carried out at 90 °C for six hours) is higher than 80 %, based on the results set forth in Table I of WICHER (see page 15, last paragraph of the present Office Action).

In this regard it is pointed out that as set forth in section VII.B.3.b. above, Example 4 of WICHER is not in accordance with the method recited in present claim 1 already for the reason that there is no second polymerization after a second addition (and impregnation) of styrene.

Additionally, even if one were to assume that the conversion in the actual suspension polymerization of Example 4 of WICHER and the polymerization in sealed ampoules on which the data set forth in Table I of WICHER is based are comparable (although WICHER states in col. 8, lines 22-24 that "results from ampoule polymerizations may not be an exact representation of results under actual suspension conditions"), there is the additional difference that the first polymerization of WICHER is carried out at 90 °C, i.e., at a temperature of (T-32) °C if it were carried out in the presence of the LLDPE-based resin beads employed in TAKASAMA (T = 122 °C, see page 3, lines 13-15 of the present specification and page 3, next to last paragraph of the Final Office Action). In other words, carrying out the method of TAKASAMA under the polymerization conditions set forth in Example 4 of WICHER would result in a first polymerization which is carried out at a temperature which is more than 24 °C lower than the temperature recited in present claim 1.

Accordingly, the conditions set forth in Example 4 of WICHER relied on by the Examiner also would not result in a combination of polymerization temperature and conversion ratio for the first polymerization as set forth in present claim 1.

4. Claims 2 and 5

Appellants submit that in view of the foregoing facts it is apparent that the Examiner has failed to establish a *prima facie* case of obviousness of the subject matter of present claim 1 over TAKASAMA in view of WICHER. The same applies to the subject matter of claims 2 and 5.

Specifically, the method of claim 2 differs from the method of claim 1 merely in that the second polymerization is carried out within a temperature range which is narrower than the corresponding temperature range recited in claim 1 (i.e., within a temperature range which is the same as that for the first polymerization). Claim 5 is drawn to expandable beads obtained by the method of claim 1. Since TAKASAMA in view of WICHER fails to teach or suggest the method of claim 1 it also fails to teach or suggest the beads of claim 5, i.e., beads which comprise a reduced amount of polymer powder in comparison to the beads of TAKASAMA (had they been made with a higher amount of vinyl-aromatic monomer than that taught by TAKASAMA).

C. Claim 3 Is Not Properly Rejected Under 35 U.S.C. § 103(a) As Being Unpatentable Over TAKASAMA In View Of WICHER And Further In View Of SENDA

Claim 3 is drawn to the method of claim 1 wherein the low-density polyethylene-based resin beads each have a substantially spherical shape or a cylindrical shape having an L/D (where L is a length of each bead and D is a diameter of each bead) of 0.6 to 1.6, and an average bead size of 0.2 to 1.5 mm.

Because the method of claim 3 is a method according to claim 1 it is not rendered obvious by TAKASAMA in view of WICHER for at least all of the reasons which are set forth in sections VII.B.2. and VII.B.3. above.

SENDA is unable to cure the deficiencies of TAKASAMA and WICHER set forth above. In fact, the process for the production of expandable resin beads disclosed in SENDA is completely different from those disclosed in TAKASAMA and WICHER (see, e.g., abstract and claims of SENDA).

In view of the foregoing it is submitted that for at least the reasons set forth above, the Examiner also has failed to establish a *prima facie* case of obviousness with respect to the subject matter of present claim 3.

D. Claims 8 and 9 Are Not Properly Rejected Under 35 U.S.C. § 103(a) As Being Unpatentable Over TAKASAMA In View Of WICHER And Further In View Of SMITH

Claims 8 and 9 are drawn to pre-expanded beads having a bulk density of 20 to 200 kg/m^3 which are obtained by pre-expanding the expandable beads of claim 5 (obtained by the method of claim 1) and to an expanded molded article having a density of 20 to 200 kg/m^3 which is obtained by expansion molding of these pre-expanded beads, respectively.

Consequently, the pre-expanded beads and the expanded molded article are not rendered obvious by TAKASAMA in view of WICHER for at least all of the reasons which are set forth in sections VII.B.2. and VII.B.3. above.

SMITH is unable to cure the deficiencies of TAKASAMA and WICHER in this regard. In fact, the disclosure of SMITH is limited to processes for the production of molded articles from expandable thermoplastic resin material and does not at all contain any teaching as to the

production of the starting materials (such as, e.g., expandable resin beads) for the processes disclosed therein.

In view of the foregoing it is submitted that for at least all of the reasons set forth above, the Examiner also has failed to establish a *prima facie* case of obviousness with respect to the subject matter of present claims 8 and 9.

E. Claim 4 Is Not Properly Rejected Under 35 U.S.C. § 103(a) As Being Unpatentable Over TAKASAMA

Claim 4 is drawn to expandable beads of a styrene-modified linear low-density polyethylene-based resin which comprise a volatile blowing agent and a base resin and wherein the base resin contains more than 300 parts by weight and less than 1000 parts by weight of a polystyrene-based resin component relative to 100 parts by weight of a non-crosslinked linear low-density polyethylene-based resin component, and further contains 2 to 40 wt% of a gel component comprising a graft copolymer of the polystyrene-based resin component and the low-density polyethylene-based resin component.

The method of TAKASAMA is limited, *inter alia*, to the use of 5 to 300 parts by weight of a polystyrene-based resin component relative to 100 parts by weight of a non-crosslinked linear low-density polyethylene-based resin component and accordingly, it is impossible for the modified resin beads obtained by the method of TAKASAMA to contain more than 300 parts by weight of a polystyrene-based resin component relative to 100 parts by weight of a non-crosslinked linear low-density polyethylene-based resin component as recited in present claim 4.

Appellants are unable to see that it would be obvious to one of ordinary skill in the art to employ more than 300 parts by weight of a polystyrene-based resin component relative to100 parts by weight of a non-crosslinked linear low-density polyethylene-based resin component despite the express teaching of TAKASAMA to the contrary in this regard.

In view of the foregoing it is submitted that for at least the reasons set forth above, the Examiner also has failed to establish a *prima facie* case of obviousness with respect to the subject matter of present claim 4.

F. Claims 6 and 7 Are Not Properly Rejected Under 35 U.S.C. § 103(a) As Being Unpatentable Over TAKASAMA In View Of SMITH

Claims 6 and 7 are drawn to pre-expanded beads having a bulk density of 20 to 200 kg/m^3 which are obtained by pre-expanding the expandable beads of claim 4 and to an expanded molded article having a density of 20 to 200 kg/m^3 which is obtained by expansion molding of these pre-expanded beads, respectively.

Consequently, the pre-expanded beads and the expanded molded article are not rendered obvious by TAKASAMA in view of WICHER for at least all of the reasons which are set forth in section VII.E. above.

SMITH is unable to cure the deficiencies of TAKASAMA in this regard. In fact, the disclosure of SMITH is limited to processes for the production of molded articles from expandable thermoplastic resin material and does not at all contain any teaching as to the

production and properties of the starting materials (such as, e.g., expandable resin beads) for the processes disclosed therein.

In view of the foregoing it is submitted that for at least the reasons set forth above, the Examiner also has failed to establish a *prima facie* case of obviousness with respect to the subject matter of present claims 6 and 7.

G. Claims 1-9 Are Not Properly Provisionally Rejected On The Ground Of Nonstatutory Obviousness-Type Double Patenting Over Claims 1, 4-6, 9-11 and 14 Of Application No. 10/540,866

1. Summary Rejection

The rejection merely alleges that each of the present claims "corresponds to" one of claims 1, 4-6, 9-11 and 14 of application No. 10/540,866, without providing any explanation as to why this alleged "correspondence" allegedly makes the subject matter of claims 1-9 obvious variants of the subject matter of claims 1, 4-6, 9-11 and 14.

2. Response

Present claims 1-9 all have in common that they recite, either directly or indirectly (by being dependent from a corresponding claim) a polymerization temperature of higher than (T-8) °C or lower than (T+1) °C and/or resin components of the expandable beads which contain a gel component comprising 2 to 40 wt% of a graft polymer. In contrast, all of claims 1, 4-6, 9-11 and 14 of application No. 10/540,866 recite, either directly or indirectly, a polymerization temperature of (T-15) to (T-8) °C or (T+1) to (T+5) °C (where T °C is the melting point of the

low-density polyethylene-based resin beads) and/or resin components of the expandable beads which contain a gel component comprising less than 2 wt% of a graft polymer.

Accordingly, claims 1, 4-6, 9-11 and 14 of application No. 10/540,866 teach away from, rather than render obvious the subject matter of present claims 1 to 9, wherefore the instant provisional obviousness-type double patenting rejection of the latter claims over the former claims is without merit.

VIII. CONCLUSION

Appellants respectfully submit that for at least all of the foregoing reasons, the Examiner has failed to establish a *prima facie* case of obviousness of any of the rejected claims 1-9 over TAKASAMA, WICHER, SENDA and SMITH, and over claims 1, 4-6, 9-11 and 14 of co-pending application No. 10/540,866. The Board is, therefore, respectfully requested to reverse the rejection of claims 1-9, and to allow the application to issue in its present form.

In this regard and to the extent it may be relevant, Appellants further submit that the Japanese Patent Office has allowed claims 1-3 and 5-9.

Respectfully submitted,
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CLAIMS APPENDIX

1. A method for producing expandable beads of a styrene-modified linear low-density polyethylene-based resin comprising, in the order recited, the steps of:

dispersing 100 parts by weight of non-crosslinked linear low-density polyethylene-based resin beads, 30 to 300 parts by weight of a styrene-based monomer, and 0.1 to 0.9 parts by weight of a polymerization initiator relative to 100 parts by weight of the styrene-based monomer into a suspension containing a dispersant;

impregnating the styrene-based monomer into the low-density polyethylene-based resin beads by heating a resultant dispersion at such a temperature that polymerization of the styrene-based monomer does not substantially take place;

performing a first polymerization of the styrene-based monomer at a temperature of higher than (T-8) °C and lower than (T+1) °C (where T °C is a melting point of the low-density polyethylene-based resin beads);

adding a styrene-based monomer and 0.1 to 0.9 parts by weight of a polymerization initiator relative to 100 parts by weight of the styrene-based monomer when a conversion ratio of polymerization reaches to 80 to 99.9%, and performing impregnation of the styrene-based monomer into the low-density polyethylene-based resin beads and a second polymerization of the styrene-based monomer at a temperature of higher than (T-15) °C and lower than (T+5) °C (where T °C is a melting point of the polyethylene-based resin beads) (wherein a total amount of the styrene monomers used in the first and second polymerizations is more than 300 parts by weight and not more than 1000 parts by weight relative to 100 parts by weight of the low-density polyethylene-based resin beads); and

impregnating a volatile blowing agent during or after the polymerization,

whereby resin components of the expandable beads contain a gel component comprising 2 to 40 wt% of a graft polymer.

2. A method for producing expandable beads of a styrene-modified linear low-density polyethylene-based resin according to Claim 1, wherein the second polymerization is performed at a temperature in a range of higher than (T-8) °C and lower than (T+1) °C.

3. A method for producing expandable beads of a styrene-modified linear low-density polyethylene-based resin according to Claim 1, wherein the linear low-density polyethylene-based resin beads each have a substantially spherical shape or a cylindrical shape having an L/D (where L is a length of each bead and D is a diameter of each bead) of 0.6 to 1.6, and an average bead size of 0.2 to 1.5 mm.

4. Expandable beads of a styrene-modified linear low-density polyethylene-based resin comprising a volatile blowing agent and a base resin, the base resin containing more than 300 parts by weight and less than 1000 parts by weight of a polystyrene-based resin component relative to 100 parts by weight of a non-crosslinked linear low-density polyethylene-based resin component, wherein the base resin contains 2 to 40 wt% of a gel component comprising a graft copolymer of the polystyrene-based resin component and the low-density polyethylene-based resin component.

5. Expandable beads of a styrene-modified linear low-density polyethylene-based resin obtained by the method of Claim 1.

6. Pre-expanded beads having a bulk density of 20 to 200 kg/m^3, obtained by pre-expanding the expandable beads of the styrene-modified linear low-density polyethylene-based resin of Claim 4.

7. An expanded molded article having a density of 20 to 200 kg/m^3, obtained by expansion molding of the pre-expanded beads of Claim 6.

8. Pre-expanded beads having a bulk density of 20 to 200 kg/m^3, obtained by pre-expanding the expandable beads of the styrene-modified linear low-density polyethylene-based resin of Claim 5.

9. An expanded molded article having a density of 20 to 200 kg/m^3, obtained by expansion molding of the pre-expanded beads of Claim 8.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.